

REMARKS

In the Office Action, the Examiner rejected claims 1-19 and 42-46. By this paper, the Applicants cancelled claim 43, added new claims 47-51, and amended claims 2 and 42 for clarification of certain features to expedite allowance of the present application. For example, the Applicants incorporated claim 43 into independent claim 42. These amendments do not add any new matter. Upon entry of these amendments, claims 1-19, 42, and 44-51 will be pending in the present application and are believed to be in condition for allowance. In view of the foregoing amendments and the following remarks, the Applicants respectfully request reconsideration and allowance of all pending claims.

Claim Rejections under 35 U.S.C. § 102

In the Office Action, the Examiner rejected claims 1-19 and 42-46 under 35 U.S.C. § 102(b) as anticipated by Dombrovski et al. (U.S. Patent No. 6,313,556, hereinafter “Dombrovski”). Claims 1, 11, and 42 were rejected under 35 U.S.C. § 102(b) as anticipated by Kutateladze et al. (U.S. Patent No. 4,236,091, hereinafter “Kutateladze”). Claims 1, 11, and 42 were rejected under 35 U.S.C. § 102(b) as anticipated by Steinmeyer (U.S. Patent No. 6,536,218, hereinafter “Steinmeyer”). Claims 1, 11, and 42 were rejected under 35 U.S.C. § 102(b) as anticipated by Lambrecht et al. (U.S. Patent No. 4,035,678, hereinafter “Lambrecht”). Applicants respectfully traverse these rejections.

Legal Precedent and Guidelines

Anticipation under section 102 can be found only if a single reference shows exactly what is claimed. *Titanium Metals Corp. v. Banner*, 778 F.2d 775, 227 U.S.P.Q. 773 (Fed. Cir. 1985). For a prior art reference to anticipate under section 102, every element of the claimed invention must be identically shown in a single reference. *In re Bond*, 910 F.2d 831, 15 U.S.P.Q.2d 1566 (Fed. Cir. 1990). To maintain a proper rejection under section 102, a single reference must teach each and every limitation of the

rejected claim. *Atlas Powder v. E.I. du Pont*, 750 F.2d 1569 (Fed. Cir. 1984). Accordingly, the Applicants need only point to a single element not found in the cited reference to demonstrate that the cited reference fails to anticipate the claimed subject matter. The prior art reference also must show the *identical* invention “*in as complete detail as contained in the ... claim*” to support a *prima facie* case of anticipation. *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 U.S.P.Q. 2d 1913, 1920 (Fed. Cir. 1989).

The cited reference is missing features recited by independent claim 1.

The present independent claim 1 recites, *inter alia*, “a first passageway extending through a side wall of the rotatable shaft to the axial passageway”. The independent claim 1 further recites, *inter alia*, “the axial passageway and the first passageway are operable to convey a cryogenic fluid to the superconductive rotor coil”. The independent claim 1 further recites, *inter alia*, “the first passageway is oriented transverse to the axial passageway at least through the side wall.”

The Dombrovski reference fails to teach or suggest the foregoing features, among others, as recited by claim 1. In contrast Dombrovski reference discloses supply and return conduits extending through an end (not a side wall) of the rotatable shaft. See Dombrovski, FIG. 1. Specifically, Dombrovski reference discloses:

The shaft extension 34 is hollow and receives a rotating cryogenic transfer coupling 42 which links the cryogenic refrigeration system 16 to the interior of the rotor 14 via respective supply and return conduits 44 and 46.

Dombrovski, FIG. 1, col. 4, lines 61-65 (emphasis added). It is clearly evident from FIG. 1 of Dombrovski reference that the supply and return conduits do not extend through the sidewall of the shaft extension. As illustrated in FIG. 1, the conduits 44 and 46 are coupled to the coupling 42 rather than the shaft extension. The conduits 44 and 46 cannot possible be interpreted to extend through a side wall of the shaft extension. Moreover, the supply conduit 44 is coupled directly to an end (not a side) of the coupling 42. For at

least these reasons, among others, the Dombrovski reference cannot anticipate independent claim 1 and its dependent claims.

Similarly, the Kutateladze reference also fails to teach or suggest the features discussed above with reference to the Dombrovski reference. In contrast, Kutateladze reference discloses a rotor having power leads having cooling ducts connected to a Ranque vortex tube and to the coolant discharge line. See Kutateladze, Abstract. Specifically, Kutateladze reference discloses:

A cavity 15 of the rotor 3 houses a Ranque vortex tube 16 whose tangential inlet communicates, via a piping 17, with the rotatable element of an assembly 18 to supply the coolant to the rotor 3, which assembly 18 has its immovable element connected with a line 19 to feed the coolant to the rotor 3. The central outlet of the Ranque vortex tube 16 is connected, via a piping 20, to the inlet of the annular cooling ducts 11, 12 of the reducer portions 9, 10, respectively. The peripheral outlet of the Ranque vortex tube 16 communicates, via a piping 21, with the inlet of the annular cooling duct 14 of the shield 13. The outlet of the annular cooling duct 14 communicates with the second inlet of the cooling duct of at least one of the reducer portions, namely, with the second inlet of the annular cooling duct 11 of the reducer portion 9. The annular cooling ducts 11, 12 communicate, via radial ducts, with gas traps 22, 23, respectively, which are connected, via control valves 24, with a line 25 to withdraw the coolant from the rotor 3. There is a piping 30, intended to withdraw the evaporated coolant from the superconducting winding 7. The piping 30 connects the outlets of the cooling ducts 8 with a second inlet (on the heat-absorbing side) of the recuperative heat exchanger 26 having its second outlet (on the heat-absorbing side) connected, via a piping 31, with the gas trap 22 and, via the latter, with the coolant discharge line 25.

Kutateladze, FIG. 1, col. 4, lines 18-37, and 53-59 (emphasis added). It is clear from the foregoing passage that Kutateladze reference does not disclose “the axial passageway and the first passageway are operable to convey a cryogenic fluid to the superconductive rotor coil” and “the first passageway is oriented transverse to the axial passageway at least through the side wall,” as recited by claim 1. The Examiner has failed to establish adequate support for the foregoing rejection with reference to Kutateladze. For at least

these reasons, among others, the Kutateladze reference cannot anticipate independent claim 1.

Similarly, the Steinmeyer reference also fails to teach or suggest the features discussed above with reference to the Dombrovski reference. In contrast, Steinmeyer discloses a cryocooler having a co-rotating cold head and a transfer unit with a gas coupling for conveying a working gas between the stationary and rotating parts. Specifically, Steinmeyer reference discloses:

From the warm-side head part 37, a gas connection line 6a leads centrally through the shaft 32 to a coupling 40 of a transfer unit. The coupling, denoted by 40, between a rotating gas line 6a, leading to a cold head, at the end of a rotor shaft 32 and a stationary gas line 6b, leading to a valve mechanism, contains a stationary, cup-like sealing housing 41 enclosing the gas line 6b.

Steinmeyer, FIG. 3, col. 6, lines 1-3, and 25-29 (emphasis added). Applicants respectfully wish to point out that Steinmeyer does not disclose “the axial passageway and the first passageway are operable to convey a cryogenic fluid to the superconductive rotor coil” and “the first passageway is oriented transverse to the axial passageway at least through the side wall” as recited by claim 1. Here again, with reference to Steinmeyer, the Examiner has failed to establish adequate support for the foregoing rejection. For at least these reasons, among others, the Steinmeyer reference cannot anticipate independent claim 1.

Similarly, the Lambrecht reference also fails to teach or suggest the features discussed above with reference to the Dombrovski reference. In contrast, Lambrecht reference discloses a coolant junction head surrounding the shaft at an end thereof adjacent the excitation winding. Specifically, Lambrecht reference discloses:

The rotor 1 is supported on a shaft having an end 5 at the exciter side of the rotor 1, and the end 5 is enclosed by a coolant connecting or junction head 4 through which helium is supplied to the rotor shaft and discharged therefrom. The coolant is conducted from a refrigerating machine 6

through a line 7 into a coolant supply chamber 8 and, from the latter into an axial bore 9 formed in the shaft 5 of the motor 1. The coolant, which is then heated as it passes through the superconductive exciter windings 2 and the cold shield 3, discharges from the shaft end 5 through radial bores 10 into a coolant path collection chamber 11 surrounding the shaft end 5, and if fed therefrom through a line 12 to the refrigerating machine 6.

Lambrecht, drawing, col. 2, lines 47-60 (emphasis added). Indeed, Lambrecht does disclose a coolant supply path and coolant discharge path provided to the shaft end. But the foregoing passage and drawing of the Lambrecht reference fails to disclose “the axial passageway and the first passageway are operable to convey a cryogenic fluid to the superconductive rotor coil” and “the first passageway is oriented transverse to the axial passageway at least through the side wall” as recited by claim 1. Here again, with reference to Lambrecht, the Examiner has failed to establish adequate support for the foregoing rejection. For at least these reasons, among others, the Lambrecht reference cannot anticipate independent claim 1.

The cited reference is missing features recited by independent claim 11.

The present independent claim 11 recites, *inter alia*, “a transfer coupling comprising a passageway operable to be disposed radially around a rotatable shaft”. The Dombrovski reference fails to teach or suggest “a transfer coupling comprising a passageway operable to be disposed radially around a rotatable shaft” as recited by claim 1. In contrast, Dombrovski discloses “a shaft extension 34 is hollow and receives a rotating cryogenic transfer coupling 42 which links the cryogenic refrigeration system 16 to the interior of the rotor via respective supply and return conduits 44 and 46”. See Dombrovski, FIG. 1, col. 4, lines 61-65. It is clear from the foregoing passage that Dombrovski discloses that the transfer coupling is fitted into the shaft extension. Dombrovski does not disclose “a transfer coupling comprising a passageway operable to be disposed radially around a rotatable shaft” as recited by independent claim 11. For at least this reason, among others, the Dombrovski reference cannot anticipate independent claim 1 and its dependent claims.

Similarly, the foregoing passages and drawings of Kutateladze does not disclose “a transfer coupling comprising a passageway operable to be disposed radially around a rotatable shaft” as recited by independent claim 11. For at least this reason, among others, the Kutateladze reference cannot anticipate independent claim 11.

Similarly, Steinmeyer does not disclose ““a transfer coupling comprising a passageway operable to be disposed radially around a rotatable shaft” as recited by independent claim 11. In contrast, Steinmeyer discloses “from the warm-side head part 37, a gas connection line 6a leads centrally through the shaft 32 to a coupling 40 of a transfer unit”. See Steinmeyer, FIG. 3, col. 6, lines 1-3. For at least this reason, among others, the Steinmeyer reference cannot anticipate independent claim 11.

Similarly, Lambrecht does not disclose ““a transfer coupling comprising a passageway operable to be disposed radially around a rotatable shaft” as recited by independent claim 11. In contrast, Lambrecht discloses “the rotor 1 is supported on a shaft having an end 5 at the exciter side of the rotor 1, and the end 5 is enclosed by a coolant connecting or junction head 4 through which helium is supplied to the rotor shaft and discharged therefrom”. See Lambrecht, col. 2, lines 47-51. It is clear that the junction head of Lambrecht is coupled to the shaft end as disclosed by the foregoing passage. For at least this reason, among others, the Lambrecht reference cannot anticipate independent claim 11.

The cited reference is missing features recited by independent claim 42.

Amended independent claim 42 recites, *inter alia*, “a crosswise passageway extending in a crosswise direction through an outer perimeter of the rotatable shaft to the lengthwise passageway”. The claim 42 further recites, “another crosswise passageway extending in another crosswise direction through the rotatable shaft to the lengthwise passageway.” As discussed above with reference to independent claim 1, the cited

references fail to disclose these features of claim 42. For at least these reasons, among others, the cited references cannot anticipate independent claim 42 and its dependent claims.

Claims 2

The Examiner rejected dependent claim 2 as being anticipated by Dombrovski, Kutateladze, Steinmeyer, and Lambrecht references. Amended dependent claim 2 recites, *inter alia*, “a second passageway extending through the side wall of the rotatable shaft to the axial passageway and operable to return the cryogenic fluid from the superconductive coil.” Again, as discussed in detail above with reference to independent claims 1 and 42, the cited references do not teach or suggest these claim features. For at least this reason, among others, the cited references cannot anticipate dependent claim 2.

Claims 3, 15, and 44

The Examiner rejected dependent claims 3, 15, and 44 as being anticipated by Dombrovski, Kutateladze, Steinmeyer, and Lambrecht. Dependent claims 3, 15, and 44 recite in generally similar language, e.g., a first axial tube and a second axial tube disposed telescopically within the axial passageway. The cited references are clearly missing these claim features. For at least this reason, among others, the cited references cannot anticipate dependent claims 3, 15, and 44.

Claims 4 and 16

The Examiner rejected dependent claims 4 and 16 as being anticipated by Dombrovski, Kutateladze, Steinmeyer, and Lambrecht references. Dependent claims 4 and 16 recite in generally similar language, e.g., a first axial tube and a second axial tube disposed side-by-side within the axial passageway. The cited references do not teach or suggest these claim features. For at least this reason, among others, the cited references cannot anticipate dependent claims 4 and 16.

Claims 6 and 17

The Examiner rejected dependent claims 6 and 17 as being anticipated by Dombrovski, Kutateladze, Steinmeyer, and Lambrecht references. Dependent claims 6 and 17 recite in generally similar language, e.g., the first axial tube and the second axial tube are doubled walled. The cited references do not teach or suggest these claim features. For at least this reason, among others, the cited references cannot anticipate dependent claims 6 and 17.

Claims 7 and 18

The Examiner rejected dependent claims 7 and 18 as being anticipated by Dombrovski, Kutateladze, Steinmeyer, and Lambrecht references. Dependent claims 7 and 18 recite in generally similar language, e.g., the first axial tube and the second axial tube each comprise a coating operable to reduce the emissivity of the first axial tube and the second axial tube to reduce radiative heat transfer to the cryogenic fluid. The cited references do not teach or suggest these claim features. For at least this reason, among others, the cited references cannot anticipate dependent claims 7 and 18.

Claims 8 and 46

The Examiner rejected dependent claims 8 and 46 as being anticipated by Dombrovski, Kutateladze, Steinmeyer, and Lambrecht references. Dependent claims 8 and 46 recite in generally similar language, e.g., a cryogenic transfer coupling disposed radially around the rotatable shaft. As discussed above with reference to independent claim 11, the cited references do not teach or suggest these claim features. For at least this reason, among others, the cited references cannot anticipate dependent claims 8 and 46.

New Claims

As noted above, the Applicants hereby add new dependent claims 47-51 to recite various features that further distinguish the claims over the cited references. These

claims do not add any new matter. In addition, the Applicants stress that the new claims are currently in condition for allowance for the same reasons as discussed in detail above, and also in view of the features recited in each respective claim.

Conclusion

The Applicants respectfully submit that all pending claims should be in condition for allowance. However, if the Examiner believes certain amendments are necessary to clarify the present claims or if the Examiner wishes to resolve any other issues by way of a telephone conference, the Examiner is kindly invited to contact the undersigned attorney at the telephone number indicated below.

Respectfully submitted,

Date: June 19, 2007

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